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PATENT COOPERATION TREATY 10/527443

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year) 25.11.2004

Applicant's or agent's file reference
P018298WOP

IMPORTANT NOTIFICATION

International application No.
PCT/GB 03/03938

International filing date (day/month/year)
10.09.2003

Priority date (day/month/year)
10.09.2002

Applicant
INGENIA HOLDINGS LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference P018298WOP	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA416)	
International application No. PCT/GB 03/03938	International filing date (day/month/year) 10.09.2003	Priority date (day/month/year) 10.09.2002
International Patent Classification (IPC) or both national classification and IPC G06K19/06		
Applicant INGENIA HOLDINGS LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 08.04.2004	Date of completion of this report 25.11.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Schmidt, R Telephone No. +49 89 2399-2491 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/03938**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-56 as originally filed

Claims, Numbers

1-64 received on 17.11.2004 with letter of 15.11.2004

Drawings, Sheets

1/23-23/23 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/03938**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-64
	No: Claims	
Inventive step (IS)	Yes: Claims	1-64
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-64
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/03938

Re Item V.

1. Reference is made to the following document:

D1: US-A-5 268 043

Document D1 was not cited in the international search report. A copy of said document has already been provided to the Applicant.

2. Regarding the subject-matter of claim 1, document D1 discloses a security device comprising at least one magnetic element (12), wherein said magnetic element is responsive to an applied magnetic field to provide a characteristic response (cf. column 5, line 45 - column 6, line 18).

Since the available documents do neither disclose nor suggest to make said magnetic element from a material that comprises structural defects that cause brittle mode switching in which the magnetic growth of a single magnetic domain dominates the change in magnetisation of a respective magnetic element, the subject-matter of claim 1 meets the requirements of Article 33(2) and (3) PCT.

- 2.1 The same applies for independent claims 20, 33, and 48 since they contain corresponding features related to brittle mode switching characteristics.

CLAIMS

1. A security device comprising at least one magnetic element, wherein said at least one magnetic element is responsive to an applied magnetic field to provide a characteristic response, characterised in that said at least one magnetic element is made
5 from a material that comprises structural defects that cause brittle mode switching in which the growth of a single magnetic domain dominates the change in magnetisation of a respective magnetic element.
2. The security device of Claim 1, wherein said at least one magnetic element is supported by a substrate.
- 10 3. The security device of Claim 2, wherein said at least one magnetic element is supported on said substrate.
4. The security device of any preceding Claim, wherein said at least one magnetic element is responsive to said applied magnetic field to switch the magnetisation or magnetic polarisation of said at least one magnetic element.
- 15 5. The security device of any preceding Claim, wherein said at least one magnetic element is made from a magnetically soft material.
6. The security device of Claim 5, wherein said at least one magnetic element comprises a magnetically soft material selected from one or more of: nickel, iron, cobalt and alloys thereof with each other or silicon, such as nickel iron alloy, cobalt
20 iron alloy, iron silicon alloy or cobalt silicon alloy.
7. The security device of Claim 5 or 6, wherein said magnetically soft material is a permalloy material.
8. The security device of any preceding Claim, wherein said at least one magnetic element is substantially wire-shaped or flattened wire shaped.
- 25 9. The security device of any preceding Claim, wherein said at least one magnetic element is backed by a light reflective layer.

10. The security device of any preceding Claim, wherein said at least one magnetic element is provided proximal a reduced light reflectivity portion of said security device.
11. The security device of any preceding Claim, comprising a plurality of said at least one magnetic elements.
12. The security device of Claim 11, wherein said plurality of magnetic elements is arranged to provide a linear pattern.
13. The security device of Claim 11, wherein said plurality of magnetic elements is arranged to provide a two-dimensional pattern.
- 10 14. The security device of Claim 12 or Claim 13, wherein said pattern encodes an identifier.
15. The security device of any preceding Claim, further comprising a unique identifier incorporated therewith.
- 15 16. The security device of claim 15, wherein said unique identifier is provided by way of one or more of: an optically readable bar code; one or more optical indicia; a magnetically encoded identifier; and an electronic identifier.
17. The security device of claim 16, mounted upon a smart-card, wherein said electronic identifier is provided by a smart-card chip provided on said smart-card.
18. The security device of any preceding Claim, wherein premeasured characteristic response information representing one or more measurable parameters of said characteristic response is stored on said security device.
- 20 19. The security device of Claim 18, wherein said premeasured characteristic response information is in encrypted form.
20. A method of manufacturing a security device, comprising:

providing at least one magnetic element comprising structural defects, wherein said at least one magnetic element provides a brittle mode switching characteristic response in response to an applied magnetic field.

21. The method of Claim 19, comprising providing said at least one magnetic
5 element on a substrate.
22. The method of Claim 20 or Claim 21, comprising forming said at least one magnetic element using a lift-off or wet etching process.
23. The method of Claim 20 or Claim 21, comprising forming said at least one magnetic element using an ion beam etching process.
- 10 24. The method of any one of Claims 20 to 23, comprising measuring the magnitude(s) of one or more magnetic parameters of said at least one magnetic element.
25. The method of Claim 24, comprising measuring one or more of coercivity and jitter values.
- 15 26. The method of Claim 24 or Claim 25, comprising using the measured magnitude(s) of said one or more magnetic parameters to represent premeasured characteristic response information.
27. The method of Claim 26, comprising encrypting said premeasured characteristic response information.
- 20 28. The method of Claim 26 or Claim 27, comprising storing said premeasured characteristic response information in encrypted or unencrypted form on said security device.
29. The method of Claim 26 or Claim 27, comprising storing said premeasured characteristic response information in encrypted or unencrypted form in a storage
25 medium remote from said security device.

30. The method of Claim 29, comprising storing said premeasured characteristic response information in encrypted or unencrypted form in a database.

31. The method of any one of Claims 20 to 30, further comprising providing said security device with a unique identifier.

5 32. The method of Claim 31 when dependant upon any one of Claims 27 to 30, comprising storing a representation of said unique identifier in association with said premeasured characteristic response information.

33. A system for reading a security device, comprising:
a magnetic field generation system for applying a magnetic field to a security
10 device; and
a detection system for measuring one or more parameters representative of a brittle mode switching measured characteristic response of said security device in response to said magnetic field,

wherein said system is operable to compare said one or more parameters
15 representative of a brittle mode switching measured characteristic response to one or more respective parameters of a brittle mode switching premeasured characteristic response to determine whether respective measured and premeasured parameters are substantially equivalent.

34. The system of Claim 33, wherein the magnetic field generation system is
20 operable to apply a time varying magnetic field to a security device.

35. The system of Claim 33 or Claim 34, wherein a light beam is used to interrogate said security device.

36. The system of any one of Claims 33 to 35, wherein said light beam is a visible or near-infrared beam produced by a laser diode.

25 37. The system of any one of Claims 33 to 36, wherein said parameters represent one or more of coercivity and jitter values.

38. The system of any one of Claims 35 to 37, wherein said detection system incorporates magneto-optic Kerr effect detection apparatus for detecting changes induced in said light beam by magnetic elements of said security device.
39. The system of Claim 38, wherein said magneto-optic Kerr effect detection
5 apparatus is configured to operate in transverse mode.
40. The system of any one of Claims 35 to 39, further operable to deflect said light beam across the surface of said security device.
41. The system of any one of Claims 33 to 40, further operable to read a unique identifier from said security device.
- 10 42. The system of Claim 41, wherein said unique identifier is identified by recognising a pattern of magnetic elements supported by said security device.
43. The system of Claim 41 or 42, wherein said unique identifier is identified by reading one or more of: an optically readable bar code; one or more optical indicia; a magnetically encoded identifier; and an electronic identifier.
- 15 44. The system of any one of Claims 33 to 43, further operable to determine said one or more respective parameters of the premeasured characteristic response by reading said one or more parameters from said security device.
45. The system of any one of Claims 33 to 44, further operable to determine said one or more respective parameters of the premeasured characteristic response by
20 reading said one or more parameters from a database.
46. The system of Claim 45, wherein said database is remotely located from said detection system.
47. The system of any one of Claims 33 to 46, further operable to decrypt premeasured characteristic response information where it is read or provided in
25 encrypted form.
48. A method for reading a security device, comprising:

applying a magnetic field to a security device;

measuring one or more parameters representative of a brittle mode switching measured characteristic response of said security device in response to said magnetic field; and

- 5 comparing said one or more parameters representative of a brittle mode switching measured characteristic response to one or more respective parameter(s) of a brittle mode switching premeasured characteristic response to determine whether respective measured and premeasured parameters are substantially equivalent.

49. The method of Claim 48, comprising applying a time varying magnetic field to
10 a security device.

50. The method of Claim 48 or Claim 49, wherein measuring of one or more parameters representative of a measured characteristic response of said security device in response to said magnetic field comprises measuring one or more of coercivity and jitter values.

15 51. The method of any one of Claims 48 to 50, comprising interrogating said security device using a light beam.

52. The method of any one of Claims 48 to 51, comprising operating a laser to produce a visible or near-infrared beam.

53. The method of Claim 51 or Claim 52, comprising detecting changes induced in
20 said light beam by magnetic elements of said security device using the magneto-optic Kerr effect.

54. The method of Claim 53, comprising using the magneto-optic Kerr effect transverse mode.

55. The method of any one of Claims 51 to 54, comprising deflecting said light
25 beam across the surface of said security device.

56. The method of any one of Claims 48 to 55, comprising reading a unique identifier from said security device.

57. The method of Claim 56, comprising identifying said unique identifier by recognising a pattern of magnetic elements supported by said security device.

58. The method of Claim 56 or 57, comprising identifying said unique identifier by reading one or more of: an optically readable bar code; one or more optical indicia; a
5 magnetically encoded identifier; and an electronic identifier.

59. The method of any one of Claims 48 to 58, comprising determining said respective one or more parameters of the premeasured characteristic response by reading said one or more parameters from said security device.

60. The method of any one of Claims 48 to 59, comprising determining said one or
10 more respective parameters of the premeasured characteristic response by reading said one or more parameters from a database.

61. The method of Claim 60, comprising accessing a database remotely located from said detection system.

62. The method of any one of Claims 48 to 61, further comprising decrypting
15 premeasured characteristic response information where it is read or provided in encrypted form.

63. A product comprising the security device of any one of Claims 1 to 19.

64. The product of Claim 63, comprising one or more of: a document; a passport; an identity card; a compact disc; a digital versatile disc; a software product; packaging;
20 an item of clothing; an item of footwear; a smart-card; a credit or bank card; a cosmetic item; an engineering part; an accessory; and any other goods and/or items of commerce, whether manufactured or otherwise.